Chapter 12
Unmanned Aerial Vehicles

This chapter provides the basic characteristics of selected unmanned aerial vehicles (UAVs) either in use or readily available to the OPFOR. Therefore, the UAVs discussed in this chapter are those likely to be encountered by U.S. forces in varying levels of conflict. The selection of UAVs is not intended to be all-inclusive, rather a representative sampling of various military capabilities.

UAVs come in various types, sizes, and levels of complexity, each having their own niche over the battlefield. For example, fixed-wing, propeller-driven platforms excel in endurance and range; jet-propelled UAV's trade endurance for speed; and rotary-wing UAVs can carry relatively large payloads.

UAVs are also referred to as drones or remotely piloted vehicles (RPVs) depending on their flight control. An on-board computer with the flight plan programmed into it prior to the mission controls drones. RPVs use a data link to a ground control station where the pilot/operator controls the flight manually. Many modern UAVs are capable of operating in either manner.

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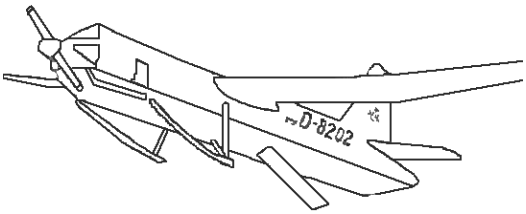
Chinese Unmanned Aerial Vehicle D-4



D-4 UAV with reusable solid rocket booster prior to jettison after take off

SYSTEM
Alternative Designations: ASN-104/105
Date of Introduction: 1985
Proliferation: At least 1 country

Description:
Engines: 1x –30 hp HS-510 four-cylinder, two-stroke gasoline air-cooled piston
Propulsion: 2-blade wooden push propeller
Weight (kg):
- Takeoff: 140
- Fuel and Payload (combined): INA

Speed (km/h):
- Maximum (level): 205
- Cruise: 150

Ceiling (m):
- Maximum: 3,200
- Minimum: 100

Fuel (liters): INA
Endurance (hr): 2
Range (km):
- RPV Mode: 60
- Relay/Programmed Mode: 100 (est.)

Dimensions (m):
- Wing Span: 4.3
- Length (fuselage): 3.3
- Height: 0.9 (excluding skids)

Launch Method: Solid rocket booster on a zero length launcher.
Recovery Method: Parachute (nonsteerable)
Landing Method: 2 spring loaded skids
Maximum Flights Per Aircraft: INA

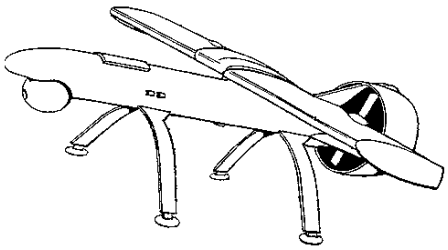
Survivability/Countermeasures: INA

SENSOR/OPTICS
Payload Type: Panoramic Camera, Low Light Television (with zoom) and IR linescan
Television field of view: INA
IR Linescan:
- Length: INA
- Resolution: INA

VARIANTS: None

NOTES
The D-4 UAV is launched from a zero-length launcher using a solid rocket booster that is jettisoned after take-off.

Russian Unmanned Aerial Vehicle Shmel-1



SYSTEM
Alternative Designations: Bumblebee
Date of Introduction: 1991
Proliferation: At least 2 countries

Description:
Engines: 1x 32-hp Samara/Trud (Kuznetsov) P-032 two-cylinder, two-stroke gasoline
Propulsion: 3-blade shrouded pusher propeller
Weight (kg):
Takeoff: 130
Fuel and Payload (combined): 70
Speed (km/h):
Maximum (level): 180
Cruise: 140
Ceiling (m):
Maximum: 3,000
Minimum: 50
Fuel (liters): INA
Endurance (hr): 2
Range (km):
RPV Mode: 60
Relay/Programmed Mode: 120 (est.)
Dimensions (m):
Wing Span: 3.25
Length (fuselage): 2.78
Height: 1.10

Launch Method: Rocket-assisted catapult
Recovery Method: Parachute (nonsteerable)
Landing Method: 4 spring loaded landing legs
Maximum Flights Per Aircraft: 10 to 20

Survivability/Countermeasures:
The engine and propeller are enclosed in a shrouded ring that serves the purpose of reducing noise as well as reducing the surface reflection and heat signature.

SENSOR/OPTICS
Payload Type: Television and IR linescan
Television Field of View: 3º to 30º (zoom)
IR Linescan:
Length: 3 to 4 times aircraft altitude
Resolution: 3 milliradians

VARIANTS: None

LAUNCH VEHICLE
Designation: BTR-D
Alternative Designations: BMD M1979
Description:
Crew: 2
Combat Weight (mt): 6.7
Chassis Length Overall (m): 5.88
Height w/o Launch unit (m): 1.67
Width Overall (m): 2.63

Automotive Performance:
Engine Type: 240-hp Diesel
Cruising Range (km): 500
Speed (km/h):
Max Road: 61 (est.)
Max Off-Road: 35 (est)
Average Cross-Country: INA
Max Swim: 10 (est.)
Fording Depth (m): Amphibious

Radio: R-123

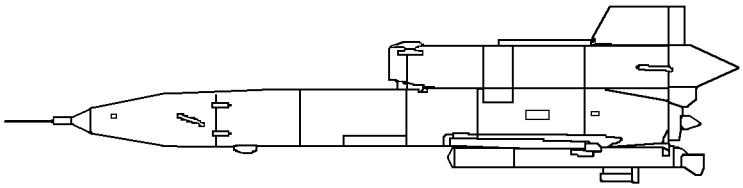
Protection:
Armor, Turret Front (mm): "Antibullet" (7.62-mm)
NBC Protection System: Yes
Smoke Equipment: None

NOTES
The Shmel-1 is part of a complex called the STERKH, which is probably an acronym of unknown expansion. The STERKH complex consists of a launcher, a support/maintenance vehicle, and at least one (probably as many as three) aircraft. The Yakolev Design Bureau designed the STERKH.

The transporter-launcher-controller (TLC) has positions for two UAV operators and is capable of controlling two Shmel-1's simultaneously. Automatic pre-launch monitoring, launch, flight control, and displaying of the received data is conducted from the TLC. The display in the TLC indicates aircraft position overlaid onto the television image. Given the system's digital downlink, the IR image could also be recorded on magnetic tape or displayed on a video monitor. However, the data is almost certainly recorded on electronic medium for playback. The description of the system may indicate a problem involving the inability of the operator to translate aircraft coordinates to those of the targets being located. A laser rangefinder or designator could easily accomplish this, but such a capability is not indicated for the Shmel-1. The current system requires coordinate conversion from map association or photographic interpretation with a laser capability to be added later.

The area coverage of the sensor payload is excellent. Analysis indicates that the camera, at an altitude of 1500 meters and a field of view of 30º, can image an area of approximately 500,000 m^2 or a circle with a radius of 400 meters. The IR linescan at the same altitude would see a strip approximately 5,100 meters long and 4.5 meters wide. Ground resolution would decrease significantly at the ends of the scan. At a nominal speed of 120 km/h and flying the maximum altitude, the aircraft could observe a maximum of 192 km^2/h with the television system or 1,200 km^2/h with the IR linescan.

Russian Unmanned Aerial Vehicle TU-143 Reys



SYSTEM
Alternative Designations: DR-3
Date of Introduction: 1973
Proliferation: At least 7 countries

Description:
Engines: 1x – TRD TR3-117 turbojet
Propulsion: Jet
Weight (kg):
  Takeoff: 1,600
  Fuel and Payload (combined): 1,540
Speed (km/h):
  Maximum (level): 940
  Cruise: 850
Ceiling (m):
  Maximum: 5,000
  Minimum: 50
Fuel (liters): 190
Endurance (minutes): 25
Range (km):
  RPV Mode: N/A
  Relay/Programmed Mode: 360
Dimensions (m):
  Wing Span: 2.24
  Length (fuselage): 8.06
  Height: 1.54 (excluding skids)

Launch Method: Solid rocket booster on a mobile transporter-erector-launcher (TEL)
Recovery Method: Parachute (nonsteerable)
Landing Method: 3 retractable skids (tricycle gear)
Maximum Flights Per Aircraft: 10

Survivability/Countermeasures: INA

SENSOR/OPTICS
Payload Type: Panoramic Camera, Low Light Television and radiation detection equipment
Television field of view: INA
IR Linescan:
  Length: INA
  Resolution: INA

VARIANTS: None

NOTES
The DR-3 normally operates at a reconnaissance depth of 150 km and is preprogrammed prior to each mission. It is launched from a mobile TEL using a solid rocket booster (that is jettisoned after take-off) in tandem with the turbojet engine. The DR-3 uses its onboard navigation and guidance control to cruise at preset altitudes (four total) between 50 to 2,000 meters. Prior to landing, a drogue chute is deployed to slow the speed of the DR-3 prior to deployment of the main recovery parachute. A braking rocket engine (located in the fuselage) is activated at an altitude of approximately 1.8 meters to soften the landing on the "tricycle landing gear". The DR-3 reconnaissance payload normally consists of two versions (besides the radiation detection version). The first version consists of an AP-402M aerial camera with Zima-M IR-reconnaissance equipment. The second payload consists of an AP-402M aerial camera with an Aist-M TV system. The camera film is removed and processed in a data processing station upon completion of the mission. However, data from both the TV and radiation detection equipment is downlinked in real-time to the ground control station.